

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: NEO-RAY

Report Number: P923167

Luminaire Tested: DFN2DIP-SQ4F0-090D120US940-RLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P923167  
REPORT IS A COMBINATION OF REPORTS P901694 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-090D120US940-RLLONL  
Description: 4 foot, Square Define Geo, with Direct 1in Regressed Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

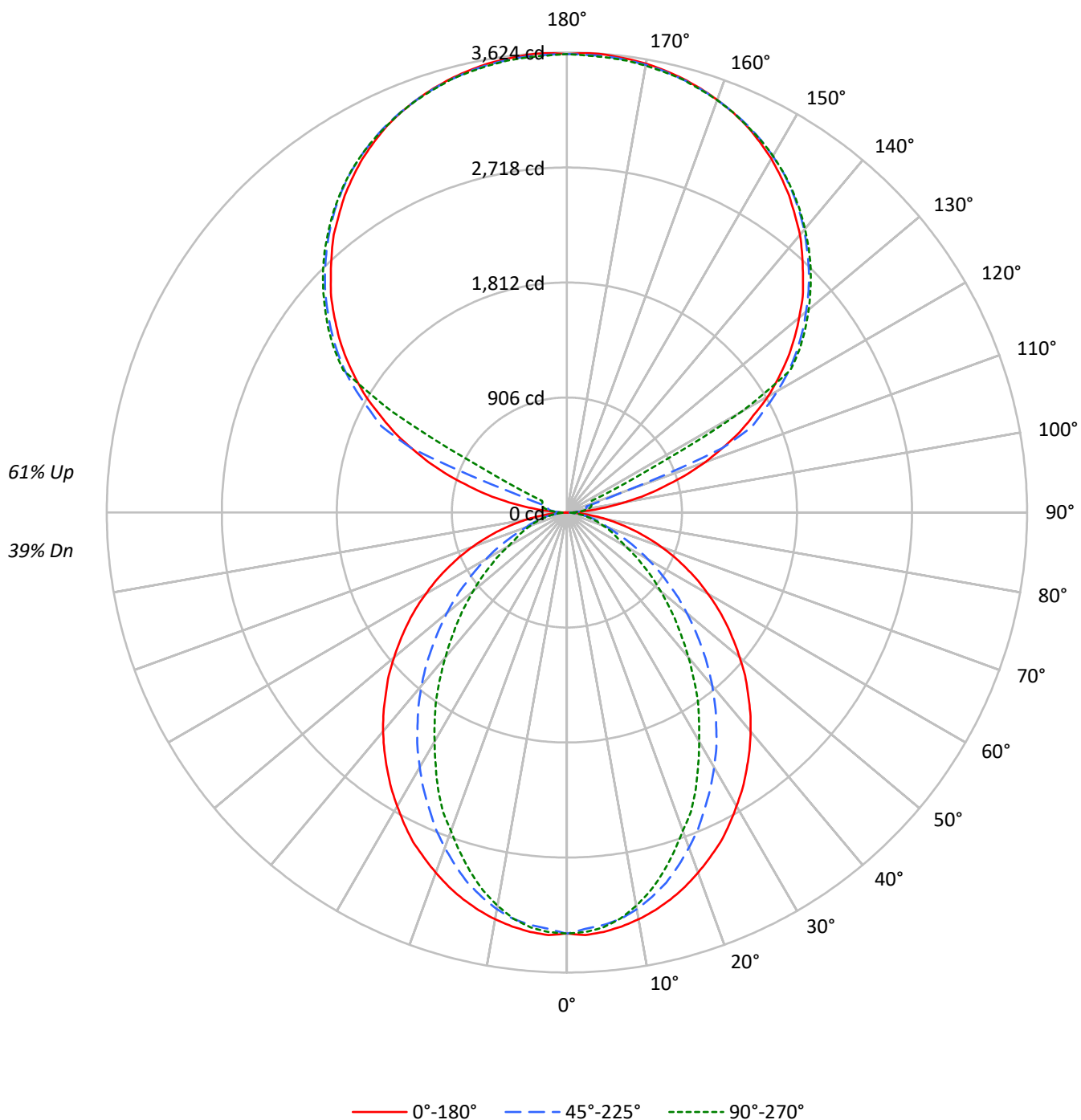
Lumens per Lamp: N/A  
Luminaire Lumens: 17415.1 lumens  
Efficiency: N/A  
Efficacy: 100.8 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 0.99 / 1.16  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: Semi-Indirect

Input Watts (W): 172.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.983  
Total Harmonic Distortion (THDi): 0.073  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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### Luminous Intensity Polar Plot



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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20 |    |    |    | 20 |    |    |    | 20 |    |    |    | 20 |
| RC  | 80  |     |     |     | 70 |    |    |    | 50 |    |    |    | 30 |    |    |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 105 | 105 | 105 | 105 | 95 | 95 | 95 | 95 | 77 | 77 | 77 | 61 | 61 | 61 | 46 | 46 | 46 |
| 1   | 96  | 92  | 88  | 85  | 87 | 83 | 80 | 78 | 68 | 66 | 64 | 54 | 53 | 52 | 41 | 41 | 40 |
| 2   | 87  | 80  | 75  | 70  | 79 | 73 | 68 | 64 | 60 | 57 | 54 | 48 | 46 | 44 | 37 | 35 | 34 |
| 3   | 80  | 71  | 64  | 58  | 73 | 65 | 59 | 54 | 53 | 49 | 46 | 43 | 40 | 37 | 33 | 31 | 29 |
| 4   | 73  | 63  | 55  | 50  | 67 | 58 | 51 | 46 | 48 | 43 | 39 | 38 | 35 | 32 | 30 | 27 | 26 |
| 5   | 67  | 56  | 48  | 43  | 61 | 52 | 45 | 40 | 43 | 38 | 34 | 35 | 31 | 28 | 27 | 25 | 23 |
| 6   | 62  | 51  | 43  | 37  | 56 | 46 | 40 | 35 | 39 | 34 | 30 | 31 | 28 | 25 | 25 | 22 | 20 |
| 7   | 57  | 46  | 38  | 33  | 52 | 42 | 35 | 31 | 35 | 30 | 26 | 29 | 25 | 22 | 23 | 20 | 18 |
| 8   | 53  | 42  | 34  | 29  | 49 | 38 | 32 | 27 | 32 | 27 | 23 | 26 | 22 | 20 | 21 | 18 | 16 |
| 9   | 50  | 38  | 31  | 26  | 45 | 35 | 29 | 24 | 29 | 24 | 21 | 24 | 20 | 18 | 19 | 17 | 15 |
| 10  | 46  | 35  | 28  | 23  | 42 | 32 | 26 | 22 | 27 | 22 | 19 | 22 | 19 | 16 | 18 | 15 | 13 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2327 | 2327 | 2327 |
| 5°  | 2331 | 2291 | 2306 |
| 10° | 2308 | 2246 | 2231 |
| 15° | 2276 | 2173 | 2116 |
| 20° | 2234 | 2071 | 1974 |
| 25° | 2191 | 1956 | 1837 |
| 30° | 2133 | 1839 | 1663 |
| 35° | 2077 | 1713 | 1510 |
| 40° | 2019 | 1582 | 1335 |
| 45° | 1952 | 1437 | 1176 |
| 50° | 1883 | 1291 | 1021 |
| 55° | 1810 | 1135 | 872  |
| 60° | 1727 | 971  | 718  |
| 65° | 1630 | 805  | 647  |
| 70° | 1514 | 650  | 587  |
| 75° | 1367 | 574  | 535  |
| 80° | 1155 | 483  | 467  |
| 85° | 803  | 325  | 355  |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 1952 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 310.9   | 1.8       |
| 10°-20°   | 853.4   | 4.9       |
| 20°-30°   | 1198.1  | 6.9       |
| 30°-40°   | 1306.0  | 7.5       |
| 40°-50°   | 1200.4  | 6.9       |
| 50°-60°   | 942.7   | 5.4       |
| 60°-70°   | 613.6   | 3.5       |
| 70°-80°   | 315.9   | 1.8       |
| 80°-90°   | 87.0    | 0.5       |
| 90°-100°  | 119.1   | 0.7       |
| 100°-110° | 443.9   | 2.5       |
| 110°-120° | 1177.3  | 6.8       |
| 120°-130° | 1952.7  | 11.2      |
| 130°-140° | 2074.2  | 11.9      |
| 140°-150° | 1927.7  | 11.1      |
| 150°-160° | 1549.8  | 8.9       |
| 160°-170° | 998.7   | 5.7       |
| 170°-180° | 343.7   | 2.0       |
| 0°-30°    | 2362.4  | 13.6      |
| 0°-40°    | 3668.4  | 21.1      |
| 0°-60°    | 5811.5  | 33.4      |
| 0°-90°    | 6828.0  | 39.2      |
| 90°-120°  | 1740.3  | 10.0      |
| 90°-150°  | 7694.9  | 44.2      |
| 90°-180°  | 10587.0 | 60.8      |
| 0°-180°   | 17415.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 3317 | 3317  | 3317 | 3317  | 3317 |      |
| 5°   | 3317 | 3302  | 3263 | 3290  | 3281 | 315  |
| 15°  | 3155 | 3122  | 3020 | 2963  | 2933 | 889  |
| 25°  | 2864 | 2768  | 2570 | 2446  | 2401 | 1317 |
| 35°  | 2468 | 2314  | 2050 | 1861  | 1795 | 1544 |
| 45°  | 2017 | 1816  | 1501 | 1288  | 1216 | 1558 |
| 55°  | 1534 | 1300  | 975  | 796   | 738  | 1371 |
| 65°  | 1036 | 792   | 522  | 420   | 411  | 1027 |
| 75°  | 552  | 342   | 240  | 219   | 216  | 584  |
| 85°  | 129  | 66    | 57   | 57    | 57   | 148  |
| 90°  | 2    | 31    | 52   | 66    | 70   | 16   |
| 95°  | 170  | 84    | 102  | 115   | 112  | 201  |
| 105° | 794  | 873   | 160  | 188   | 199  | 849  |
| 115° | 1502 | 1547  | 1612 | 402   | 214  | 1479 |
| 125° | 2124 | 2158  | 2208 | 2226  | 2234 | 1895 |
| 135° | 2629 | 2671  | 2694 | 2720  | 2715 | 2031 |
| 145° | 3050 | 3047  | 3091 | 3110  | 3096 | 1907 |
| 155° | 3358 | 3334  | 3366 | 3381  | 3361 | 1547 |
| 165° | 3538 | 3522  | 3530 | 3549  | 3530 | 1000 |
| 175° | 3619 | 3601  | 3606 | 3624  | 3598 | 344  |
| 180° | 3611 | 3611  | 3611 | 3611  | 3611 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 3316.9 | 3316.9 | 3316.9 | 3316.9 | 3316.9 |
| 2.5°   | 3331.9 | 3316.9 | 3283.7 | 3314.0 | 3308.0 |
| 5°     | 3316.9 | 3301.9 | 3262.8 | 3289.8 | 3280.9 |
| 7.5°   | 3289.8 | 3272.0 | 3230.0 | 3241.7 | 3226.7 |
| 10°    | 3253.9 | 3232.8 | 3173.0 | 3163.7 | 3145.9 |
| 12.5°  | 3208.9 | 3181.9 | 3100.7 | 3082.8 | 3049.6 |
| 15°    | 3154.8 | 3121.7 | 3019.8 | 2962.7 | 2932.8 |
| 17.5°  | 3091.7 | 3043.7 | 2917.5 | 2851.6 | 2803.5 |
| 20°    | 3019.8 | 2959.6 | 2809.5 | 2734.7 | 2668.4 |
| 22.5°  | 2941.8 | 2872.6 | 2698.4 | 2596.5 | 2551.6 |
| 25°    | 2863.7 | 2767.5 | 2569.5 | 2446.5 | 2401.3 |
| 27.5°  | 2770.7 | 2668.4 | 2449.4 | 2308.3 | 2239.2 |
| 30°    | 2671.7 | 2557.3 | 2317.2 | 2164.4 | 2083.1 |
| 32.5°  | 2575.4 | 2437.2 | 2191.4 | 2011.2 | 1936.0 |
| 35°    | 2467.5 | 2314.3 | 2050.3 | 1861.2 | 1794.9 |
| 37.5°  | 2362.4 | 2197.2 | 1918.2 | 1710.8 | 1636.0 |
| 40°    | 2251.3 | 2071.4 | 1779.9 | 1566.9 | 1488.9 |
| 42.5°  | 2137.3 | 1945.3 | 1642.0 | 1419.8 | 1344.9 |
| 45°    | 2017.2 | 1816.0 | 1500.9 | 1287.5 | 1215.6 |
| 47.5°  | 1903.2 | 1690.1 | 1365.9 | 1152.5 | 1086.6 |
| 50°    | 1777.1 | 1564.0 | 1233.8 | 1026.4 | 963.7  |
| 52.5°  | 1653.9 | 1428.7 | 1107.7 | 909.5  | 852.6  |
| 55°    | 1533.7 | 1299.7 | 975.4  | 795.6  | 738.5  |
| 57.5°  | 1410.9 | 1170.7 | 858.6  | 690.5  | 642.4  |
| 60°    | 1284.7 | 1044.5 | 735.4  | 582.5  | 534.4  |
| 62.5°  | 1161.8 | 921.7  | 630.3  | 486.3  | 462.4  |
| 65°    | 1035.6 | 792.4  | 522.3  | 420.4  | 411.2  |
| 67.5°  | 915.6  | 672.3  | 420.4  | 369.1  | 360.2  |
| 70°    | 789.5  | 555.4  | 348.1  | 318.2  | 306.0  |
| 72.5°  | 669.4  | 447.1  | 291.1  | 267.2  | 261.2  |
| 75°    | 552.2  | 342.1  | 240.1  | 219.1  | 216.2  |
| 77.5°  | 435.3  | 243.0  | 189.1  | 177.1  | 171.0  |
| 80°    | 327.1  | 174.2  | 143.9  | 132.2  | 132.2  |
| 82.5°  | 228.0  | 117.2  | 99.1   | 93.0   | 93.0   |
| 85°    | 128.9  | 65.9   | 57.0   | 57.0   | 57.0   |
| 87.5°  | 48.1   | 23.9   | 23.9   | 21.0   | 21.0   |
| 90°    | 2.5    | 31.3   | 52.2   | 65.5   | 70.4   |
| 92.5°  | 65.5   | 54.9   | 62.7   | 67.9   | 70.4   |
| 95°    | 169.7  | 83.5   | 101.7  | 115.1  | 112.4  |
| 97.5°  | 305.7  | 91.6   | 133.1  | 141.2  | 143.7  |
| 100°   | 462.6  | 104.6  | 148.9  | 169.7  | 175.0  |
| 102.5° | 634.9  | 629.9  | 154.2  | 182.8  | 190.8  |
| 105°   | 794.3  | 872.9  | 159.5  | 188.1  | 198.6  |
| 107.5° | 979.9  | 1045.1 | 164.8  | 193.3  | 203.8  |
| 110°   | 1157.7 | 1212.4 | 457.4  | 196.1  | 206.3  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1325.0 | 1371.8 | 1327.5 | 201.1  | 209.1  |
| 115°   | 1502.4 | 1546.8 | 1612.3 | 402.4  | 214.5  |
| 117.5° | 1656.7 | 1708.9 | 1753.5 | 1379.6 | 695.1  |
| 120°   | 1829.3 | 1868.3 | 1915.5 | 1946.9 | 1594.0 |
| 122.5° | 1975.4 | 2017.3 | 2069.7 | 2085.3 | 2088.0 |
| 125°   | 2124.3 | 2158.5 | 2208.1 | 2226.4 | 2234.2 |
| 127.5° | 2260.2 | 2296.9 | 2336.3 | 2362.3 | 2364.8 |
| 130°   | 2388.4 | 2430.3 | 2458.8 | 2487.7 | 2485.2 |
| 132.5° | 2519.0 | 2553.1 | 2581.7 | 2605.3 | 2602.8 |
| 135°   | 2628.9 | 2670.8 | 2694.0 | 2720.4 | 2715.2 |
| 137.5° | 2743.7 | 2775.0 | 2801.4 | 2827.4 | 2819.7 |
| 140°   | 2856.1 | 2877.1 | 2905.6 | 2929.3 | 2916.2 |
| 142.5° | 2950.3 | 2968.7 | 3002.5 | 3023.3 | 3010.2 |
| 145°   | 3049.6 | 3046.9 | 3091.2 | 3109.6 | 3096.5 |
| 147.5° | 3135.6 | 3127.9 | 3172.3 | 3185.3 | 3175.0 |
| 150°   | 3219.3 | 3201.1 | 3243.0 | 3258.5 | 3245.5 |
| 152.5° | 3289.8 | 3269.0 | 3308.2 | 3323.9 | 3305.7 |
| 155°   | 3357.7 | 3334.5 | 3365.8 | 3381.4 | 3360.6 |
| 157.5° | 3412.7 | 3391.9 | 3415.5 | 3433.8 | 3412.7 |
| 160°   | 3459.8 | 3444.1 | 3459.8 | 3475.4 | 3457.1 |
| 162.5° | 3501.5 | 3486.0 | 3499.0 | 3517.3 | 3493.7 |
| 165°   | 3538.0 | 3522.5 | 3530.3 | 3548.7 | 3530.3 |
| 167.5° | 3566.9 | 3551.1 | 3559.2 | 3577.5 | 3553.9 |
| 170°   | 3590.5 | 3574.7 | 3579.9 | 3598.2 | 3574.7 |
| 172.5° | 3606.0 | 3590.5 | 3595.8 | 3614.1 | 3590.5 |
| 175°   | 3619.0 | 3600.7 | 3606.0 | 3624.4 | 3598.2 |
| 177.5° | 3624.4 | 3606.0 | 3608.8 | 3627.1 | 3603.6 |
| 180°   | 3611.3 | 3611.3 | 3611.3 | 3611.3 | 3611.3 |

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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |      |      |      |       |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|------|------|------|-------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7  | 0.5  | 0.5  | 0.3   |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3  | 0.5  | 0.3  | 0.3   |
| Reference plane |      | 0.2              | 0.2   | 0.2   | 0.2   | 0.2   | 0.2            | 0.2  | 0.2  | 0.2  | 0.2   |
| Room dimensions |      | Viewed crosswise |       |       |       |       | Viewed endwise |      |      |      |       |
| X=2H            | Y=2H | 9.00             | 9.75  | 10.05 | 10.80 | 12.22 | 4.96           | 5.71 | 6.01 | 6.76 | 8.18  |
|                 | 3H   | 10.67            | 11.34 | 11.73 | 12.40 | 13.84 | 6.14           | 6.81 | 7.20 | 7.87 | 9.31  |
|                 | 4H   | 11.28            | 11.91 | 12.35 | 12.98 | 14.42 | 6.59           | 7.22 | 7.66 | 8.28 | 9.73  |
|                 | 6H   | 11.70            | 12.28 | 12.78 | 13.35 | 14.81 | 6.90           | 7.49 | 7.99 | 8.55 | 10.01 |
|                 | 8H   | 11.83            | 12.38 | 12.91 | 13.46 | 14.91 | 6.99           | 7.55 | 8.08 | 8.63 | 10.08 |
|                 | 12H  | 11.89            | 12.41 | 12.98 | 13.49 | 14.96 | 7.03           | 7.56 | 8.12 | 8.64 | 10.11 |
| 4H              | 2H   | 9.00             | 9.64  | 10.08 | 10.70 | 12.15 | 5.54           | 6.18 | 6.62 | 7.24 | 8.69  |
|                 | 3H   | 10.83            | 11.36 | 11.92 | 12.45 | 13.91 | 6.89           | 7.42 | 7.97 | 8.51 | 9.96  |
|                 | 4H   | 11.52            | 12.01 | 12.61 | 13.09 | 14.57 | 7.43           | 7.92 | 8.52 | 9.00 | 10.48 |
|                 | 6H   | 12.04            | 12.45 | 13.14 | 13.56 | 15.03 | 7.85           | 8.26 | 8.95 | 9.37 | 10.84 |
|                 | 8H   | 12.21            | 12.60 | 13.31 | 13.70 | 15.18 | 7.98           | 8.36 | 9.08 | 9.46 | 10.95 |
|                 | 12H  | 12.31            | 12.66 | 13.42 | 13.77 | 15.26 | 8.04           | 8.39 | 9.16 | 9.50 | 10.99 |
| 8H              | 4H   | 11.49            | 11.87 | 12.58 | 12.97 | 14.46 | 7.71           | 8.10 | 8.81 | 9.19 | 10.68 |
|                 | 6H   | 12.05            | 12.37 | 13.17 | 13.51 | 14.99 | 8.23           | 8.55 | 9.35 | 9.68 | 11.17 |
|                 | 8H   | 12.27            | 12.55 | 13.40 | 13.67 | 15.18 | 8.42           | 8.70 | 9.55 | 9.82 | 11.32 |
|                 | 12H  | 12.41            | 12.66 | 13.54 | 13.77 | 15.31 | 8.54           | 8.78 | 9.67 | 9.90 | 11.44 |
| 12H             | 4H   | 11.43            | 11.78 | 12.55 | 12.89 | 14.38 | 7.71           | 8.06 | 8.83 | 9.17 | 10.66 |
|                 | 6H   | 12.03            | 12.31 | 13.16 | 13.43 | 14.93 | 8.28           | 8.56 | 9.40 | 9.68 | 11.18 |
|                 | 8H   | 12.25            | 12.49 | 13.38 | 13.61 | 15.15 | 8.49           | 8.73 | 9.62 | 9.85 | 11.39 |

END OF REPORT